Strategy Research Project

Port and Navigation Infrastructure Development to Support U.S. Strategic Interests

by

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United States Army

United States Army War College
Class of 2012

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
01-02-2012	Strategy Research Project	

4. TITLE AND SUBTITLE

Port and Navigation Infrastructure Development to Support U.S. Strategic Interests

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Colonel Alan Dodd

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Colonel Steve Donaldson
Peace Keeping and Stability
Operations Institute

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

U.S. Army War College
122 Forbes Avenue
Carlisle, PA 17013

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

Distribution A: Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

Economic prosperity in the United States depends on trade with other nations. International trade accounts for a quarter of America's Gross Domestic Product with 95 percent of cargo traded being shipped through one of the nation's seaports. With economic globalization, the ability to transport goods becomes increasingly important to maintaining the U.S. status as a world power. The shipping industry is evolving to larger ships with greater capacity and efficiency to meet increasing global demands, requiring changes to port infrastructure. While countries in Asia and Europe are investing heavily in port infrastructure in preparation for future requirements, the U.S. has reduced spending in this area. Completion of the Panama Canal expansion in 2014 will further altering shipping patterns, creating increased demand on East Coast ports. Although the nation faces fiscal challenges, it needs a national strategy that promotes greater port development if it is to meet future demand. The U.S. must increase spending on infrastructure to keep current with transportation needs and establish systems that prioritize national infrastructure investments, supporting trade and economic policy. It must revise laws to allow greater use of existing funding for port development and update port standards to meet current shipping industry needs.

15. SUBJECT TERMS

Economics of National Security, Engineer Support, Sealift, International Trade

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			**19b. TELEPHONE NUMBER** *(include area code)*
UNCLASSIFED	UNCLASSIFED	UNCLASSIFED	UNLIMITED	28	

USAWC STRATEGY RESEARCH PROJECT

PORT AND NAVIGATION INFRASTRUCTURE DEVELOPMENT TO SUPPORT U.S. STRATEGIC INTERESTS

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This SRP is submitted in partial fulfillment of the requirements of the Master of Strategic Studies Degree. The U.S. Army War College is accredited by the Commission on Higher Education of the Middle States Association of Colleges and Schools, 3624 Market Street, Philadelphia, PA 19104, (215) 662-5606. The Commission on Higher Education is an institutional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation.

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CARLISLE BARRACKS, PENNSYLVANIA 17013

ABSTRACT

AUTHOR: Colonel Alan Dodd

TITLE: Port and Navigation Infrastructure Development to Support U.S. Strategic Interests

FORMAT: Strategy Research Project

DATE: 1 February 2012 WORD COUNT: 5,176 PAGES: 28

KEY TERMS: Economics of National Security, Engineer Support, Sealift

CLASSIFICATION: Unclassified

Economic prosperity in the United States depends on trade with other nations. International trade accounts for a quarter of America's Gross Domestic Product with 95 percent of cargo traded being shipped through one of the nation's seaports. With economic globalization, the ability to transport goods becomes increasingly important to maintaining the U.S. status as a world power. The shipping industry is evolving to larger ships with greater capacity and efficiency to meet increasing global demands, requiring changes to port infrastructure. While countries in Asia and Europe are investing heavily in port infrastructure in preparation for future requirements, the U.S. has reduced spending in this area. Completion of the Panama Canal expansion in 2014 will further altering shipping patterns, creating increased demand on East Coast ports. Although the nation faces fiscal challenges, it needs a national strategy that promotes greater port development if it is to meet future demand. The U.S. must increase spending on infrastructure to keep current with transportation needs and establish systems that prioritize national infrastructure investments, supporting trade and economic policy. It must revise laws to allow greater use of existing funding for port development and update port standards to meet current shipping industry needs.

PORT AND NAVIGATION INFRASTRUCTURE DEVELOPMENT TO SUPPORT U.S. STRATEGIC INTERESTS

> America's economic growth was built on one of the most integrated and efficient infrastructure systems in the world—from canals to railroads to highways. But our national leaders have rested on these accomplishments rather than extending them... One sign of this is that Federal infrastructure spending as a percent of GDP dropped in half between 1980 and 1997... It is time to reexamine priorities for the nation's infrastructure. America's economic well-being and physical security depend on safe and reliable public infrastructure. Roads, airports, railways, ports, and other public investments are instrumental in boosting America's productivity and global economic competitiveness.
>
> —Center for Strategic International Studies[1]

During the 20th century, the United States built a transportation system that fueled unprecedented economic prosperity, connecting population centers, economic activity, production, and consumption within the country and to the rest of the world. The national transportation system's capacity to make these connections efficiently is essential to American businesses, households, and communities. It is a competitive advantage of the U.S. economy and represents a vital national interest.[2]

Both national security and economic prosperity depend upon that system of roads, railways, seaports, and airports. The nation's transportation infrastructure supports the military industrial complex, provides access to the sea and air for power projection platforms, and enables rapid movement of American military forces and equipment anywhere in the world. It allows the United States to provide goods to global markets at competitive prices while obtaining resources and products from other nations that fulfill industry needs and maintain quality of life for Americans. As the world's economy grows more interdependent in the 21st Century, the ability to transport goods

and materials becomes an increasingly important factor in maintaining the United States' status as a world power.

While the U.S. economy is dependent on transportation capacity, the nation faces several challenges in adapting to the future globalized economy. Ports, critical to trade with other nations, need to accommodate a near doubling of cargo volumes by 2020.[3] Infrastructure standards must change with trends in the shipping industry as companies shift to significantly larger, more efficient, vessels that require deeper channels and greater material handling infrastructure.[4] Much of the nation's infrastructure is aging as federal investment, as a percentage of Gross Domestic Product (GDP), declined 45 percent in the past twenty years.[5] The federal government faces unprecedented fiscal issues and must reduce spending as the proportion of national debt relative to GDP rises.[6] Policies to define national standards and allocate funding for infrastructure are obsolete and do not prioritize funding towards truly national priorities.[7] While the challenges are significant, the United States needs a national strategy that supports greater seaport and waterway infrastructure development to meet future demands for international trade and maintain the country's economic prosperity.

The federal government has a responsibility to maintain, upgrade, and replace transportation infrastructure in a manner that supports the nation's economy. Congress, in partner with private industry, local, and state government, must develop policies and provide funding to ensure our national transportation system remains viable to future needs. It must ensure the nation's infrastructure adjusts to a changing environment marked by increased globalization and trade and changing industry standards. This study begins by reviewing national priorities and the relevance of international trade to

the national economy. It then reviews the current and projected operating environment for one sector of the transportation industry that supports international trade, the shipping industry. The shipping industry depends on publically managed ports to operate; this study reviews the current status of port infrastructure and development needed to prepare for future demand. It then reviews national policy and the federal processes that prioritize and fund infrastructure development to determine U.S. level of support for port development. Finally, this paper provides recommendations to federal policy and procedures to address challenges and better support national priorities.

International Trade and the U.S. Economy

The Pacific and Atlantic oceans separate the U.S. from trading partners in Asia and Europe. The country relies on the shipping industry to provide a cost effective means to transport international goods to and from these markets. One out of every eleven containers carrying global trade is bound for or originates from the U.S., accounting for nine percent of worldwide container traffic.[8] The U.S. is the world's largest trading nation, importing or exporting more than 1.42 billion tons of goods by sea in 2008 alone. By 2038, this quantity is expected to increase by 67 percent to more than 2.37 billion tons.[9] The nation's ports handle more than 70 percent of imported oil and 48 percent of all goods purchased by American consumers.[10] With over 95 percent of the nation's overseas trade by weight, and 75 percent by value, already moving through ports, the U.S. Department of Transportation (USDOT) projects that total freight will increase by more than 50 percent by 2020 and the volume of international container traffic will double.[11]

America's economic prosperity depends on business with other nations. U.S. trade with world markets in 2011exceeded $4.2 trillion, contributing 28 percent to the

nation's GDP.[12] The World Bank predicts by 2020 this ratio will rise to 35 percent and may be as high as 55 percent by 2038, making international trade an even more important component of the national economy.[13] The economic impact of trade is much more than just the value of materials and products shipped. More than 13.3 million U.S. workers are supported by seaports, producing $649 billion in annual personal income. Every $1 billion in exports shipped through U.S. seaports creates 15,000 new jobs, reducing unemployment and increasing income for Americans.[14]

International trade and the transportation of goods and materials are critical to the nation's economic well-being. Without safe and reliable infrastructure to move goods around the world much of the U.S. economy would come to a halt or falter.[15] To maintain economic growth and prosperity, the U.S. must ensure the shipping industry is prepared for global changes in trade and transportation and maintains capacity to support future demand of industry and consumers.

The International Shipping Industry

The international shipping industry has seen an increase in total trade volume over the last century as greater industrialization and globalization have driven free trade and the demand for more consumer products worldwide. From 1970 to 2009 the quantity of goods shipped annually by sea rose from 2,566 million to 7,843 million tons, an increase of more than 200 percent.[16] Ocean bound shipping is often the only economically practical method for transporting materials, as shipments by air are significantly more costly and movement by ground only supports trade within the Americas. Because shipping by sea is the predominant method, it supports almost every sector of international trade, transporting everything from oil and minerals to cars and televisions, with more than 120,000 merchant ships currently operating.[17] Like

other commercial industries, shipping continually adjusts to meet changes in consumer demand and the global environment in order to maximize profits. Within the U.S., the shipping industry projects total trade will continue to grow, both in terms of volume and value, with containerized trade growing in importance. Seventeen percent of seaborne tons currently imported or exported by the U.S. are containerized. By 2038 it is expected that this figure will grow to a third. The USDOT forecasts significant growth in U.S. shipping demands, with more than 78 percent of trade occurring with China and other Asian countries on Asia-Pacific routes.[18] In 2008, U.S. container ports handled 28.2 million loaded TEUs (20-foot equivalent units—a measure for counting containers).[19] By 2023 U.S containerized trade is projected to double to 60 million TEUs and will surpass 100 million TEUs by 2037.[20] Imports from China, Hong Kong, and Taiwan will be the biggest portion of U.S. trade, reaching almost 46 million TEUs by 2038. India will provide 3.3 million TEUs in imports, while other Asian and Pacific countries, excluding China, contribute 11 million TEUs by 2038. U.S. exports are also projected to increase with China, Hong Kong and Taiwan continuing as the largest recipients of U.S. cargo, receiving 9.6 million TEUs by 2038. Other Asian countries, Latin America and Europe will also be large importers of U.S. goods, with each region importing about 6 million TEUs by 2038.[21]

The economics of the shipping industry, especially in the movement of containerized cargo, have led towards concentrating capacity in fewer ships and centralization of transloading operations. This has led to development of larger and faster ships and consolidation of shipping operations within fewer ports. Companies are investing tremendous sums of money to build larger ‘megaships’ because they reduce

the transportation cost of containers by significant amounts. Up until the early 1980's, container ships typically carried approximately 1,000 to 2,500 TEUs. In 1982, United States Lines introduced a 4,000 TEU vessel, followed by 4,500 to 5,000 TEU ships in the mid-1980s. These megaships created savings of approximately 30 to 40 percent per container for a 6,000-TEU ship compared to a 2,500 TEU vessel. By 1997, shipping companies had begun building 8,000-TEU megaships to further improve cost savings. New ship orders continue this trend, with more than fifty 8,000-TEU vessels currently on order to meet future demand.[22]

With increased trade on Asia-Pacific routes and bigger ships, a constraint on the shipping industry is the ability to cross the Panama Canal. Ships are categorized as either panamax (able to transverse the Panama Canal) or post-panamax (too large or unable to transverse). Panamax is determined principally by the dimensions of the canal's lock chambers, along with draft and vessel height, resulting in maximum ship dimensions of 965 ft length, 106 ft width, and 190 ft height with no more than a 39.5 ft draft.[23] This equates to approximately 4,400 TEUs vessels as the largest capable of using the Panama Canal.[24] There are currently more than 330 post-panamax ships in service worldwide, with 60 more scheduled to begin service in the near future.[25] To support U.S trade, these larger ships must either offload on the U.S. western seaboard or travel around South America, with significant additional costs and time for the voyage. In the 1990s, Panama began a $5.25 billion project to deepen and widen the channels and add larger locks to support post-panamax ships. When completed in August 2014, the expansion will triple per-ship cargo capacity from the current 4,400 TEU limit to 12,600 TEUs, while increasing overall canal capacity from 35 to 50 ships

per day.[26] The American Planning Association provided the following example of the economic benefits derived from the expanded Panama Canal:

> The cost of transporting a 20-foot-long container from Hong Kong to the eastern U.S. through a Los Angeles port and then by rail and truck is roughly $3,500, according to Drewry Supply Chain Advisors. The firm estimates that shipping a container would cost $250 to $1,000 less if it were loaded on an 8,000-TEU ship, sent through the Panama Canal, unloaded at an East Coast port, and then hauled by rail and truck to a midwestern or southern destination.[27]

As significantly more and bigger container ships take advantage of the expanded Panama Canal, there will be a noticeable change in trade patterns at ports along the eastern United States. In order to realize the potential savings of post-panamax ships, the U.S. must deepen harbors and expand cargo-handling facilities.

Port Infrastructure

While future trends indicate a shift to much greater East Coast shipping traffic and increasingly larger ships, the desired increase in trade is not possible unless the ports are prepared to support the evolving industry. The United States Army Corps of Engineers (USACE) defines a harbor as a sheltered part of a body of water deep enough to provide anchorage for ships or a place of refuge. The port is a place by a waterway where ships and boats can dock, load and unload. Together they are commonly referred to as ports.[28] There are three basic components needed for a port to operate. First, the waterways must be deep and wide enough to allow ships to transverse the harbor and dock. Second, the waterside infrastructure must support efficient loading and unloading of ships. Third, the landside infrastructure must connect the port to other intermodal transportation (rail and road transportation networks) to deliver and receive containers and materials.

With increased ship sizes, ports need deeper channels and berths, wider turning basins, larger marine terminals, bigger cranes, and on-dock rail and trucking yards. Post-panamax ships have an average draft of 45.9 feet, requiring a minimum channel depth of at least 50 ft.[29] While five West Coast ports (Los Angeles, Long Beach, Oakland, Seattle, and Tacoma) are able to receive post-panamax ships, only two East Coast ports (Norfolk and Baltimore) have the 50 foot drafts needed. Two other ports (New York and Miami) are currently expanding to prepare for receipt of the larger ships in 2014.[30] While deepening of the port channels allows larger ships to dock, there must be much greater landside loading and unloading capacities to accommodate the larger cargo volumes discharged from megaships, thus precluding idle time of the expensive carriers. As containers and materials are offloaded, there must be greater landside infrastructure to support the volume increase, to include terminals and lay down yards. Finally, there must be more capacity to move the materials in and out of the port through connections to other transportation systems.[31]

The ongoing expansion at the Port of Miami demonstrates how all three components must be developed together to achieve increased capacity at a port to accommodate post-panamax ships in 2014. The project is expected to double cargo business at the port over the next ten years, creating more than 33,000 new jobs and resulting in more than $18B in economic impact to the region.[32] In 2012, the Port of Miami begins dredging to an increased harbor depth of 50 feet, allowing it to receive and unload panamax ships up to 13,000 TEUs in size.[33] In addition to dredging, the Port will invest close to $700 million for infrastructure improvements, including construction of a new gantry crane dock and larger container storage yards. The port

also acquired two super post-panamax gantry cranes that can efficiently load and unload 22 container (8 foot wide each) wide container ships. The State of Florida, with USDOT support, is investing more than $1 billion in road and tunnel infrastructure to connect the port to the interstate highway system, doubling truck capacity and reducing congestion. They are also investing $22.7 million to improve rail service between the port and the Florida East Coast rail yard, providing direct cargo access to the national rail system. Finally, the port upgraded its security gates and infrastructure which increased the processing rate for container trucks and reduced daily traffic backup.[34] While each individual project impacts the capability and capacity of the port, it is only through the combination of all these projects that the strategic benefits of post-panamax shipping are achieved. While possible to expand additional ports in preparation of greater shipping demand, this effort comes with a significant cost to plan and construct the developmental projects.

Port Funding

The development and upgrading of port infrastructure is expensive and requires a significant commitment of funds. Ports may be operated by a state, a county, a municipality, a private corporation, or a combination of the four. While federal, state, local, and private sector entities all participate in decisions regarding the maintenance and development of publically controlled ports, the final authorities for development and expansion are the states.[35] Funding for maintenance and development of port infrastructure can come from a variety of sources, depending on the nature of the work to be accomplished. Often development requires a partnership between federal, state, and local organizations to share the cost of projects. The federal government has primary responsibility for maintenance and construction of navigation channels and

harbors. However, it requires cost sharing for new construction and maintenance of channels deeper than 45 feet.[36] Public agencies, such as port authorities and private corporations, have responsibility for the maintenance and construction of waterside infrastructure, to include docks, cranes, container yards, and support facilities. These projects are often funded through a combination of private and local government sources. The landside infrastructure, to include highways and rail lines connecting seaports to inland intermodal transportation facilities, are primarily the responsibility of state governments and are usually funded through a combination of federal and state sources.[37]

Within the federal government's responsibility, funding for port infrastructure comes through two budgets, USDOT and USACE. USDOT typically provides grants to states to assist in development of aviation and surface transportation (highways and railways). USACE provides funds through its Civil Works program for navigation, flood and storm protection, and ecosystem restoration efforts. For 2012, the proposed USDOT budget of $129 billion includes $19 billion for aviation, $92.8 billion for highways and public transportation, and $8.3 billion for railway development. While not including any dedicated funding for port development, it does make $5 billion available within a national Infrastructure bank to support state and local governments that make capital investments in the nation's surface transportation infrastructure. These projects include roads and highways, public transportation facilities, freight and passenger rail, and port infrastructure.[38] The 2012 USACE Civil Works budget of $4.63 billion provides $2.31 billion for operation and maintenance of waterways (to include ports, inland waterways, locks, dams, and rivers); $1.48 billion for new waterways construction, and $946 million

for other Civil Works efforts (investigations, regulatory, flood control, and Formerly Used Sites Remedial Action Program). This total amount is $308 million (6 percent) below the FY11 Budget and $913 million (17 percent) below FY10 Appropriation, indicative of the federal government's efforts to reduce spending.[39] By looking at the federal investment in highways and railways versus ports, it is clear that the federal priority is transportation within the country and not with other countries.

For both agencies, political leaders determine priorities, give direction, and make funding decisions through the congressional budget process. Both USDOT and USACE have processes to prioritize and recommend projects based on national priorities, however Congress decides which of the recommended projects are funded. As the budget is developed, Congressional leaders must balance priorities for their state and constituents with those of the nation, resulting in a final budget containing earmarks and prioritization of projects with only state or regional importance.

Before USACE can execute any work, Congress must both authorize and appropriate funding for the individual projects. Congress generally authorizes USACE efforts through a Water Resources Development Act (WRDA). WRDAs include authorizations to construct projects, maintain waterways, and change existing policies guiding the USACE civil works program, such as the split of project costs between the federal government and the nonfederal project sponsors. They may also establish user fees for public waterways, collected in a trust fund to defer the operation and maintenance costs onto their users. While Congress may authorize many projects in a given year, actual appropriations limit which projects USACE will initiate. These appropriations are contained in the Energy and Water Development Appropriations

Act.[40] Approved annually, this document specifies funding levels for operations and maintenance (dredging) and new construction at individual ports and waterways. It also indentifies whether the project is to be funded from the U.S general fund or from one of the established trust funds.

The Water Resources Development Act of 1986 (WRDA '86) established the Harbor Maintenance Trust Fund (HMTF) to pay for operation and maintenance (O&M) of harbors and ports. Intended to recover 100 percent of USACE dredging expenditures, it levies a 0.125 percent tax on the value of all cargo imported or domestically moved through federally maintained channels and harbors.[41] Historically, revenues collected exceed the funds expended each year, resulting in a balance exceeding $5B.[42] Trust fund revenues in FY2011 were $1.48 billion. However the FY2012 budget only provided $758 million from the trust fund for harbor maintenance dredging.[43] While seemingly an obvious source of funding for harbor development projects, several restrictions prevent greater use of HMTF funds. HMTF funds are not automatically distributed based on the ports where they originate. Congress designates their use for individual harbor maintenance projects through the annual appropriations process, often resulting in their use at smaller ports and harbors. For channels greater than 45 feet in depth, the federal government requires local governments to pay a 50 percent cost share for maintenance before HMTF funds are used. Most importantly, the HMTF was created to only maintain existing channels and cannot be used to widen or deepen waterways.[44] Increasing channel depth or width is new construction, requiring Congress to provide non-HMTF funding and local sponsors to provide a 35 percent cost share for channels under 45 feet and 60 percent cost share for channels exceeding 45

feet.[45] The HMTF is an excellent source of revenue for port maintenance, however these legal restrictions preclude using the money for expanding port capacity to support U.S. strategic goals. Similarly, recent efforts to jump start the economy through infrastructure development do not appear to improve the port situation.

Economic Stimulus through the American Jobs Act

In 2011, President Obama announced a plan to renew and expand America's infrastructure as a way to stimulate economic growth. Based on analysis of the economic effects of transportation infrastructure investment, the Department of the Treasury with the Council of Economic Advisers determined the federal government should increase investments in transportation infrastructure to generate both short and long term benefits. The American Jobs Act would create an immediate demand for jobs, with 61 percent in the construction sector, 12 percent in the manufacturing sector, and 7 percent in retail trade. If passed, it would provide $50 billion for infrastructure investment, rebuilding 150,000 miles of roads, constructing 4,000 miles of railways, and rehabilitating or reconstructing 150 miles of runways.[46]

While recognizing the importance of transportation infrastructure, the act does not identify port development projects as a way to stimulate economic growth, other than to include them as candidates for local government grants. Unlike other transportation modes, it leaves port development as a state and local responsibility, failing to recognize their importance to national economic growth. While this approach stimulates employment with short term economic benefits, it does not prioritize federal funding through a strategic plan that will maximize benefits based on long term economic objectives like increasing trade. Ultimately, the American Jobs Act will

improve portions of domestic transportation network, but does not recognize and improve all of the transportation modes needed to increase global trading.

Comparison of International Investments in Seaports

While U.S. funding for ports continues to decline, countries like India, Brazil and the United Kingdom commit the equivalent of billions of U.S. dollars for port and channel modernization. Increased trading, larger ships and the Panama Canal expansion are driving ports around the world to deepen navigation channels and improve harbor facilities. China has invested $3.3 trillion since 2000 and recently announced another $105.2 billion for 23 new infrastructure projects.[47] India will invest $60 billion, including public and private funds, to create seven new major ports by 2020. Brazil has invested $240 billion since 2008, with another $340 billion committed for the next three years as it expects volume at its ports to double by 2022. Great Britain plans to spend $2.5 billion on London's Deep-Water Gateway.[48] Canada spends four percent of its GDP on transportation infrastructure while China spends nine percent. In comparison, the U.S. spends only 1.7 percent towards transportation infrastructure.

Recommendations

U.S. transportation infrastructure capacity is not developing concurrent with expected growth in transportation demand. The nation needs policies that promote greater infrastructure development that will support international trade and enable the U.S. to remain competitive in the world economy. Without adequate transportation infrastructure capacity, economic growth, productivity, and competitiveness are at risk. The United States must strategically plan and invest in port infrastructure to maximize the capacity and efficiency of shipping and transportation that supports trade with other countries. Within that industry, the capability and capacity of U.S. ports to receive and

deliver trade is clearly a constraint to increasing trade. Without increased capacity, the transportation system will become a competitive disadvantage for U.S. industries, making it harder to sustain the growth of the national economy.[49] Based on this analysis, there are several changes that can be made to improve infrastructure development in support of national objectives. These recommendations are as follows:

Increase Investments in Transportation Infrastructure to Support Economic Growth

The National Chamber Foundation has reviewed several studies that demonstrate the relationship between infrastructure development and economic growth. Their research indicates greater public investment in infrastructure development will have positive impacts for a nation, but believe the magnitude of the impact varies by types of improvement. One British study cited indicates, on average, a 10 percent increase in public infrastructure may increase GDP by as much as 2 percent.[50] Another study prepared by the Department of the Treasury with the Council of Economic Advisors demonstrates large private sector productivity gains can result from well planned public infrastructure investments. A recent analysis by the Congressional Budget Office stated additional investment in infrastructure is among the most effective policy options for raising output and employment.[51] As the U.S. considers options to reduce the federal deficit while stimulating economic growth, it should increase spending on transportation infrastructure, particularly those that support greater trade with other nations. By improving the efficiency and capacity of international shipping, the U.S. economy can benefit from increased exports and reduced costs for imports.

Develop a National Transportation Investment Policy That Links Infrastructure Development to Trade And Economic Policy

National policy to prioritize and manage transportation infrastructure development must be conducted in a more systemic manner to focus on and address national priorities, to include promotion of economic growth. The current system of authorizations and appropriations allows Congressional members to influence funding of individual port projects with little regard for the national economic impact of increased port capacity. There must be a holistic analysis of all transportation means and requirements to determine those elements that most support national priorities of economic growth, trade, and development. Not all ports, highways, and infrastructure support national transportation demand equally. Those that are identified as strategically important should be prioritized for federal funding.

A systems approach to funding and development, based on requirements and contribution to national priorities, can help identify overall transportation development priorities without the constraints within certain funding categories (port dredging versus highway construction). Establishment of a national infrastructure committee, separate from Congress, may balance requirements for port development with road, railway, and airport development within a strategic approach to facilitate national and international transportation and shipping. Establishment of a national infrastructure financing committee can synchronize federal loans and grants to states or local governments to support specific projects that are most important to national priorities. Development of a national transportation infrastructure policy would allow the federal government to superimpose national policy objectives across all infrastructure modes, focusing limited resources on those projects that maximize benefit to the nation. While not usurping the

Congressional authority to authorize and fund projects, greater federal involvement throughout the process may balance national and state interests, allowing leaders to make better informed decisions.

Revise Dredging Standards and WRDA Cost Sharing Formula

The government should revise the federal cost-sharing formula for navigation improvement projects to reflect new standards in the shipping industry. The current policy sets a channel depth of 45 feet as point where the non –federal share of expenses increases from 35 to 60 percent for new construction and 0 to 50 percent for maintenance work. While the federal government desire to share costs with local partners is understandable, these standards were developed when ships were much smaller. Based on changing industry standards and growth in the size of ships, this depth standard should be increased to 55 feet to accommodate the evolving transportation requirement. The federal government should develop ports identified as strategically important to achieving national priorities, such as expansion of international trade, to the new standard as maintenance, and not construction work. This frees state and local governments to use their infrastructure funds for improved waterside and landsite infrastructure.

The Harbor Maintenance Trust Fund

The Harbor Maintenance Trust Fund was developed as a source of revenue to fund maintenance dredging. However the federal government does not spend all the funds collected for needed work. Approximately 50 percent of the funds collected are subsequently appropriated in the Civil Works budget for dredging projects while the remaining funds are added to the federal government's general account. Congress should rewrite the WRDA to create a direct linkage between funds collected in a fiscal

year and funds expended on dredging priorities. With increased funding for waterway maintenance, USACE should be given the flexibility to conduct waterway maintenance and dredging based on national priorities determined by the federal government and without need of project specific authorizations by Congress. Excess funds each year should be used to support high priority new construction requirements, continued development of ports to the updated 55 foot depth, or other needs that best support national shipping priorities.

Conclusion

The continued growth and economic prosperity of the United States depends on its ability to successfully compete in global trade markets. The world's economy is becoming more interdependent, resulting in international trade becoming increasingly important to the nation. As international trade grows, cargo volumes and the demands for low cost, international shipping are also growing at an unprecedented rate. The international shipping industry is preparing to meet this demand by investing in larger, more efficient ships that provide the capacity needed in the 21st Century. While new, larger ships improve efficiency and cost effectiveness of shipping, other efforts such as the Panama Canal expansion open better trade routes that allow products to be delivered closer to where they are needed. While these efforts improve efficiency and reduce transportation costs, they also place new demands on U.S. ports.

Unless a port has deeper channels and greater material handling infrastructure, it cannot take advantage of the savings these larger ships bring. This creates an infrastructure challenge for the U.S. that must be met to support its economic objectives of international trade. The system to prioritize, authorize, and fund waterway infrastructure development is complex and does not support growth of international

trade or U.S. economic prosperity. The nation needs to identify and develop transportation infrastructure based on national priorities. It must increase funding of infrastructure development and develop policies that ensure that projects that provide the greatest economic benefit to the nation receive the highest priority for funding. Ports that support national strategic objectives of international trade and economic growth must be improved to enhance their productivity and connectivity with highway and rail transportation systems. National policies, to include the Water Resources Development Act and the Harbor Maintenance Trust Fund, must be changed to improve federal support to port development. Many other nations are investing more of their GDP towards infrastructure development now, to realize the benefits of increased international trade in the next twenty years. Unless the United States recognizes the importance of port development, it will not have the shipping capacity needed to support its trade with other countries and achieve its economic objectives.

Endnotes

[1] Center for Strategic International Studies, *Public Works, Public Wealth: New Directions for America's Infrastructure*, November 2005, 4, http://csis.org/files/media/csis/pubs/publicworkspublicwealth.pdf (accessed December 7, 2011).

[2] The U.S. Department of Transportation, *Draft U.S. DOT Strategic Plan FY2010 – 2015* (Washington, DC: April 15, 2010), 33, www.dot.gov/stratplan/dot_strategic_plan_10-15.pdf (accessed December 5, 2011).

[3] Cambridge Systematics, Inc., *The Transportation Challenge: Moving the U.S. Economy*, April 2008 (Washington, DC, National Chamber Foundation of the U.S. Chamber of Commerce), 4, http://www.uschamber.com/reports/transportation-challenge (accessed December 3, 2011).

[4] Christopher Koch, *The Economic Importance of Seaports: Is the United States Prepared for 21st Century Trade Realities,* Statement before the United States House of Representatives Committee on Transportation and Infrastructure Subcommittee on Water Resources and Environment, October 26, 2011.

[5] Cambridge Systematics, Inc., *The Transportation Challenge*, 3.

[6] U.S. Congressional Budget Office, *Confronting the Nation's Fiscal Policy Challenges* (Washington, DC, Congressional Budget Office, September 13, 2011), http://www.cbo.gov/doc.cfm?index=12413&zzz=42046 (accessed November 22, 2011).

[7] Center for Strategic and International Studies, Business Roundtable, *Guiding Principles for Strengthening America's Infrastructure*, March 27, 2006, http://csis.org/files/media/csis/pubs/060327_infrastructure_principles.pdf (accessed November 12, 2011).

[8] The U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *America's Container Ports: Linking Markets at Home and Abroad* (Washington, DC, U.S. Department of Transportation, January 2011).

[9] The U.S. Department of Transportation (USDOT), Maritime Administration, *An Evaluation of Maritime Policy in Meeting the Commercial and Security Needs of the United States* (Washington, D.C., U.S. Department of Transportation, January 7, 2009), 8.

[10] Jo-Ellen Darcy, *The Economic Importance of Seaports: Is the United States Prepared for 21st Century Trade Realities,* Statement before the United States House of Representatives Committee on Transportation and Infrastructure Subcommittee on Water Resources and Environment, October 26, 2011.

[11] American Association of Port Authorities, "U.S. Public Port Facts," http://www.aapa-ports.org/files/PDFs/facts.pdf (accessed November 29, 2011).

[12] U.S. Department of Commerce, International Trade Commission, *U.S. Trade Overview* (Washington, DC: U.S. Government Printing Office, June 24, 2011), http://www.trade.gov/mas/ian/build/groups/public/@tg_ian/documents/webcontent/tg_ian_002065.pdf (accessed December 3, 2011).

[13] The U.S. Department of Transportation (USDOT), Maritime Administration, *An Evaluation of Maritime Policy*, 6.

[14] Jerry A. Bridges, *The Economic Importance of Seaports: Is the United States Prepared for 21st Century Trade Realities,* Statement before the United States House of Representatives Committee on Transportation and Infrastructure Subcommittee on Water Resources and Environment, October 26, 2011.

[15] Executive Office of the President, *Recent Examples of the Economic Benefits From Investing in Infrastructure*, (Washington, DC, November, 2011), 1.

[16] United Nations Conference on Trade and Development, *Review of Maritime Transport: 2010*, 8, http://www.unctad.org/en/docs/rmt2010_en.pdf (accessed December 12, 2011).

[17] Ibid, 30.

[18] Merge Global Value Creation Initiative, “Insomnia: Why Challenges Facing the World Container Shipping Industry Make for More Nightmares Than They Should,” *American Shipper Magazine*, July, 2008, 69.

[19] The U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, *America’s Container Ports: Freight Hubs That Connect Our Nation to Global Markets*, (Washington, DC, U.S. Department of Transportation, June 2009).

[20] The U.S. Department of Transportation (USDOT), Maritime Administration, *An Evaluation of Maritime Policy*, 10.

[21] Ibid, 15.

[22] Thomas Wakeman and Thomas Costanzo, “International Trade and Port Infrastructure Development,” *Proceedings from the American Society of Civil Engineers Ports Conference*, 2004, http://dx.doi.org/10.1061/40727(2004)97 (accessed November 29, 2011).

[23] Panama Canal Authority, “Vessel Requirements,” January 1, 2011, http://www.pancanal.com/eng/op/notices/2011/N01-2011.pdf (accessed November 14, 2011).

[24] Thomas Wakeman and Thomas Costanzo, “International Trade and Port Infrastructure.”

[25] American Association of Port Authorities, “Cost-Sharing of Federal Channels,” http://aapa.files.cms-plus.com/PDFs/Cost-haring%20of%20Federal%20Channels%202011.pdf (accessed November 29, 2011).

[26] Henry Fountain, “Panama Adding a Wider Shortcut for Shipping,” *New York Times*, August 16, 2011, http://www.nytimes.com/2011/08/17/science/17canal.html (accessed November 29, 2011).

[27] Jeffrey Spivak, “The Battle of the Ports: East Coast Ports Hope the Panama Canal Improvements Will Send Business Their Way,” *Planning Magazine,* May 2011, http://aapa.files.cms-plus.com/Battle%20of%20the%20Ports%20-%20Planning%20mag%20-%20May_June%202011.pdf (accessed October 26, 2011).

[28] The United States Army Corps of Engineers Institute for Water Resources, *National Economic Development Manual for Deep Draft Navigation* (Washington, DC: U.S. Army Corps of Engineers, April 2010), 30.

[29] American Association of Port Authorities, “Cost-Sharing of Federal Channels.”

[30] Jo-Ellen Darcy, “The Economic Importance of Seaports.”

[31] Thomas Wakeman and Thomas Costanzo, “International Trade and Port Infrastructure.”

[32] The United States Army Corps of Engineers, Jacksonville District, “Fact Sheet, Miami Harbor Deepening,” 2 Dec 2011.

[33] Bill Johnson, “Port of Miami: Up to the Challenge,” http://www.miamidade.gov/portofmiami/library/factsheet_deep_dredge.pdf (accessed December 1, 2011).

[34] Ibid.

[35] The U.S. Department of Transportation (USDOT), Maritime Administration, *An Evaluation of Maritime Policy*, 25.

[36] American Association of Port Authorities, “Cost-Sharing of Federal Channels.”

[37] Christopher Koch, “The Economic Importance of Seaports.”

[38] The US Department of Transportation, *U.S. Department of Transportation Fiscal Year 2011 Budget Highlights* (Washington, DC: U.S. Department of Transportation, February 1, 2010), 36, http://www.dot.gov/budget/2011/2011budgethighlights.pdf (accessed December 17, 2011).

[39] Mike Pfenning and Stephen DeLoach, “USACE Civil Works Program & Budget Outlook and Engineering Opportunities,” briefing slides for USACE Briefing to the Society of American Military Engineers, March 23, 2011, http://www.ncmbc.us/USACE_Civ_Wks-_Pfenning-DeLoach.pdf.pdf (accessed December 19, 2011).

[40] Nicole T. Carter and H. Steven Hughes, *Army Corps of Engineers Water Resources Projects: Authorization and Appropriations* (Washington, DC: U.S. Library of Congress, Congressional Research Service, November 26, 2008), 6.

[41] John Frittelli, *Harbor Maintenance Trust Fund Expenditures* (Washington, DC: U.S. Library of Congress, Congressional Research Service, January 25, 2010), 2.

[42] Ibid, 5-6.

[43] Jerry A. Bridges, “The Economic Importance of Seaports.

[44] John Frittelli, “Harbor Maintenance Trust Fund Expenditures,” 3-4.

[45] American Association of Port Authorities, “Cost-Sharing of Federal Channels.”

[46] The Department of the Treasury with the Council of Economic Advisers, *An Economic Analysis of Infrastructure Investment* (Washington, DC, The White House, October 11,2010), 2-4, http://www.whitehouse.gov/sites/default/files/infrastructure_investment_report.pdf (accessed December 4, 2011).

[47] Kurt Nagle, “Port-Related Infrastructure Investments Can Reap Dividends”, *Industry Today*, November 2011, 17.

[48] Ibid, 13.

[49] Cambridge Systematics, Inc., “The Transportation Challenge,” 81.

[50] Ibid, 97.

[51] The Department of the Treasury with the Council of Economic Advisers, *An Economic Analysis of Infrastructure Investment*, 5.